

DR. G. M. STERNBERG'S
ELECTRO-MAGNETIC REGULATOR,
 FOR
DAMPERS AND VALVES.



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SECURED BY
LETTERS — PATENT,
 No. 100,462, No. 105,272 and No. 105,273.

The figure represents the Apparatus applied to the damper of a hot air furnace, and the Regulating Thermometer hanging over the mantle in the sitting-room above. The connecting wires and a battery cup for generating the necessary current of electricity are also shown. The cup is shown below the damper, but it may, of course, be placed in any corner or closet that is convenient.

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A glance at the title of this invention as it appeared in the official list of patents for March 1st, 1870, would give but a faint idea of its value & scope.

The following are some of the more important purposes to which it is applicable :

1st. The automatic regulation of the temperature of public buildings, hospitals, factories, school-houses, dwelling-houses, malt-houses, drying-houses, &c., &c., to any point desired.

2nd. The automatic regulation of the temperature of any liquid undergoing the process of evaporation or distillation.

3rd. The automatic regulation of the supply of any liquid to a reservoir from which there is a variable flow, so as to maintain it at a constant level, *e. g.*, the height of water in a steam boiler, or in a retort.

I can give to the chemist an apparatus by which he can regulate the heat of the organic fluid he is evaporating, so that the process may be carried on at any temperature he may desire. He may go away for hours and leave his automatic regulator to control the gas stove or Bunsen burner by which the heat is furnished for the process, and upon his return he will not find that the organic matter has been burned by too much heat,

for the temperature cannot exceed the point to which he has adjusted the regulating thermometer.

I can give to the manufacturing chemist an apparatus by which he can evaporate his extracts or distill his volatile oils, &c., at any temperature he desires.

By means of this invention, the physician in charge of a hospital may be enabled to say, I will have this ward kept at a temperature of 60 degrees, and this one at 75 degrees. He may in a moment adjust the regulator for himself, secure it by lock and key if necessary, and go away with the assurance that no carelessness of nurses can allow the temperature to exceed the point he has fixed.

A gentleman of intelligence desires to have his house kept at such temperature as is most conducive to the health and comfort of himself and family. A regulating thermometer hangs in his sitting-room or parlor, wires descend to the cellar, where they are connected with the apparatus governing the damper of the furnace. He adjusts the wire in the tube of his thermometer to 65 degrees, and his servants cannot waste his fuel, render him uncomfortable, and endanger the health of his family by heating his room to a higher point.

The owner of a hot-house, of a drying-house, or other place where a fixed temperature is desirable, will soon find the advantage of having a thermometer hanging in the house which does the regulating, rather than one which must be watched by a man, who regulates the fire, if he is not careless or indifferent, and who don't, if he is.

The construction of the Regulating Thermometer is shown in Figs. 3 and 4. Fig. 3 is a thermometer for hanging in any room, the heat of which it is desired to regulate. A platinum wire is hermetically sealed in a portion of the tube prolonged below the bulb. An adjustable wire slips through the open upper extremity of the thermometer stem, and its end is thrust down the tube. This wire passes between adjusting rollers, by which it is conveniently raised or lowered, until its end stands at any desired degree of the scale. By means of binding screws, the wires B and D have electric connection with the wires E and F, which pass to the furnace or heating apparatus, wherever it may be, and are there connected with the apparatus by which the valve or damper is operated. A battery cup of any kind is interposed in the circuit at any convenient locality.

Fig. 3

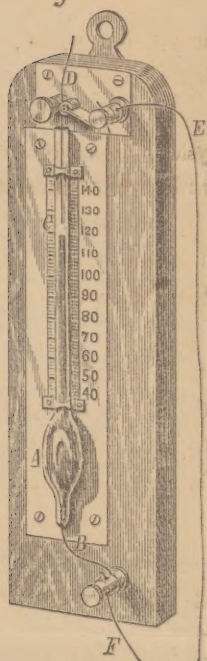
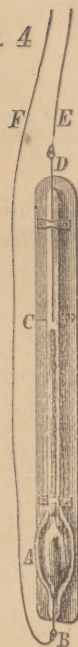


Fig. 4



As soon as the heat of the room in which the thermometer hangs, causes the mercury to rise in its tube and meet the point of the adjustable wire, an electric circuit is completed, the current passing through the helix of a temporary magnet, causes its armature to be attracted, moving a lever by which the valve or damper is closed. This closing of the damper causes the heat of the room to be diminished and the mercury to fall below the point of the wire in the thermometer tube. The electric circuit being thus broken, a spring draws the armature from the electro-magnet, and opens the damper. The damper or valve is thus regulated so as to keep the mercury in the thermometer tube oscillating at the point of the wire, and the temperature of the room is kept at very nearly a constant point.

Figure 4 represents a thermometer especially constructed for immersion in any liquid which it is desired to keep at a fixed temperature. In this thermometer both wires are hermetically sealed in their places, the upper one being so adjusted that the mercury in the thermometer tube shall reach its extremity when subjected to the temperature to which the

thermometer is designed to regulate any gas or liquid in which it may be immersed.

When the pressure of steam is to be regulated, the steam gauge acts as a regulator, the electric circuit being made or broken by its needle, which dips in a cup of mercury, adjusted at the proper point. The mechanical apparatus may either govern the supply of air allowed the furnace, by being attached to its damper, or it may govern a valve by which steam is allowed to escape from the boiler.

The height of a liquid in a reservoir is regulated by a regulating float upon its surface, by which the circuit is made or broken. When the liquid rises in the slightest degree above the point desired, the float establishes an electric circuit, and a valve in the supply pipe is closed by a lever attached to the armature of a temporary magnet, thus preventing any further flow into the receptacle. When the level of the liquid falls in the least below the point desired, the float falling with it breaks the circuit, and a spring opens the valve in the supply pipe.

EXTRACTS FROM LETTERS RECEIVED FROM WELL-KNOWN SCIENTIFIC AND PRACTICAL MEN.

DR. G. STERNBERG,

NEW YORK, April 13, 1870.

Dear Sir—*The theory of your Automatic Electro-Magnetic Regulator is sound, and if reduced to successful practice, cannot fail to be valuable. The regulative function of electricity over mechanical movements has not hitherto had the attention it deserves.*

Very respectfully,
E. L. YOUMANS.

KANSAS STATE AGRICULTURAL COLLEGE, MANHATTAN, April 15, 1870.

Dear Sir—Having seen your Electro-Magnetic Regulator, for Dampers and Valves, in practical operation at your residence and office. *I have been much pleased with its simplicity and accuracy of operation. As a regulator of heat, whether in the laboratory, factory dwelling house, or any other place, I am confident that it will justify all you claim in your circular, and letters patent.*

Yours respectfully,

B. F. MUDGE,
Prof. Nat. Sciences.

CHIEF ENGINEER'S OFFICE, ILLINOIS AND ST. LOUIS BRIDGE CO.,
St. Louis, May 3, 1870.

Dear Sir—I have examined your circular with photographs, explaining your Electro-Magnetic Regulator, for controlling the temperature of furnaces, &c. It is

very ingenious, and not too complex to prevent general use. . . . *I see no reason why the plan, as explained, may not be made entirely practicable.*

JAS. B. EADS.

STATE AGRICULTURAL COLLEGE, MANHATTAN, Ks., May 15, 1870.

SURG. G. M. STERNBERG, U. S. A.

My Dear Doctor—I have received your printed account of the Electro-Magnetic Regulator, for Dampers and Valves, patented by yourself. *I believe it will accomplish all you claim for it.* I can state this with some degree of positive knowledge, as I have been an eye-witness to its application. . . .

J. W. DAVIDSON,

Bvt. Maj. Gen. U. S. A., Prof. Mil. Science and Civil Eng.

. . . I shall give an account of it next Monday at our Academy of Sciences. . . .

ENNO SAUNDERS,

Manufacturing Chemist, St. Louis, Mo.

. . . I have decided to call the attention of the Academy of Sciences to it at the next meeting, in May.

JOHN RAUCH, M. D.,

Chicago, Ill.

FORT RILEY, Kansas, May 7, 1870.

DR. G. M. STERNBERG,

Dear Sir— . . . I cannot withhold my hearty endorsement of your great invention, the Electro-Magnetic Regulator. It has been my privilege to see it in operation, and I am fully convinced that it can be made applicable to all the purposes named in your circular. If used only as an automatical regulator of heat in hospitals and private dwellings, its worth to the world would be immense; but when you have it in common use in factories, school-houses and churches, its value in a sanitary point of view will be above all price.

CHAS. REYNOLDS,

Post Chaplain, U. S. A.

FROM THE "SCIENTIFIC AMERICAN" OF AUG. 27, 1870.

. . . It is obvious that this principle may be extended to a great variety of apparatus and operations in the industrial arts. *In fact its possible and useful applications are almost beyond enumeration.*

In distilling, especially in fractional distillation, in oil refineries, in green houses, hospitals, school-rooms, churches, in the drying of substances at fixed temperatures, in breweries, and malt houses, &c., &c., *its use would change uncertainty to precision, and render easy what are now oftentimes some of the most difficult and critical of industrial operations.*

In a sanitary point of view, its general adoption as a regulator of temperature in dwellings and public buildings seems very desirable.

We have personally inspected the operation of this ingenious instrument in the operation of heating liquids for pharmaceutical purposes, and can vouch that in this respect it is all the inventor claims for it. We see no reason why it should not perform just as satisfactorily in regulating the heat of rooms and in other operations.

THE INVENTOR

Desires to make arrangements with parties who are in a position to Manufacture and Introduce this valuable Invention in its various important applications.

Manufacturers of Heating Apparatus, Steam Boiler Manufacturers, Distillers, Manufacturing Chemists, &c., are respectfully invited to investigate the merits of this invention as applied to their several branches of business.

I am now prepared to furnish Chemists an apparatus, to be applied to a Bunsen burner or a gas stove, for regulating the temperature of any liquid undergoing evaporation or distillation, at the following moderate prices:

Regulating Thermometers	- -	\$2 to \$5 each.
Valve, Operated by Electro-Magnet	15	"
Battery Cup (Daniels')	- - -	1 75 "
Gas Stoves	- - - - -	1 25 to
Bunsen Burners	- - - - -	2 50 and 3 50.

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